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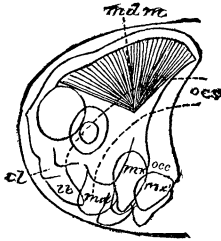
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Fig. 19, represents an embryo of a stage similar to ours, where the postoral or fourth (labial) segment is quite separate from the rest of the head. The accompanying figure, copied from our



Head of embryo *Nematus*, showing the labial segment, *occ*, forming the occiput; *cl*, clypeus; *lb*, labrum; *md*, mandible; *mdm*, muscle of same; *mx*, maxilla; *mx'*, 2d maxilla (labium); *oes*, oesophagus.

memoir, also shows in a saw-fly larva (*Nematus ventricosus*) the relations of the labial or fourth segment to the rest of the head. The suture between the labial segment and the pre-oral part of the head disappears in adult life. From this sketch it would seem that the back part of the head, *i. e.*, of the epicranium, may be made up in part of the tergite or pleurites of the mandibular segment, since the mandibular muscles are inserted on the roof of the head behind the eyes. It is this segment which in *Corydalis* evidently forms the occiput, and of which in most other insects there is no trace in larval or adult life.

It appears, then, that the epicranium, or that piece (sclerite) bearing the eyes, ocelli and antennæ and in front the clypeus and labrum, is formed from the original procephalic lobes, and represents the first or antennal segment, and is pleural, the clypeus and labrum being the tergal portion of the segment; while the remainder of the original or primitive segments are obsolete, except in those insects which retain traces of an occiput or fourth cephalic tergite. All of the gular region of the head probably represents the base of the primitive second maxillæ.

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EDITORS' TABLE.

EDITORS: A. S. PACKARD, JR., AND E. D. COPE.

— The society of mutual autopsy has presented reports on the brains of several of its deceased members to the Anthropological Society of Paris. These reports are of great interest, as being among the very few accounts which we possess of the structure of the brain in persons whose characters are known to the investigators. It is clearly the only means of acquiring the foundations for a true physiology of the thinking part of the brain, which we possess. Unfortunately we are only on the threshold of the subject, owing to the almost absolute neglect of

this important branch of research. We know of no reason why the anatomists and physiologists in every city in the world should not organize themselves into mutual autoptical societies. We will then have some basis for a true anthropology and a true metaphysics.

From a sentimental standpoint, as well as from an intellectual one, it appears to us better to utilize this beautiful organ in this way, than to permit it to take the course prescribed by the unrelenting forces of nature. Thus may science rob the grave of some of its most distinguished victims. Not that human sensibility does not shrink from applying the knife to the organ that once glowed with the fire of thought and feeling. But the alternative is much more repulsive, and has been the theme of unavailing regret since man learned to admire and love his fellow-man.

One of the members of the Anthropological Society expressed his dissatisfaction with the work of the Mutual Autoptical Society, on the presentation of the report on the brain of Louis Asse-line. He remarked that the statements of the report show clearly the immorality of such a society. He could not compliment it on the discovery of a simian characteristic in this brain. Such results, he said, were not happy. To this M. Topinard made the following just reply: "‘You are not happy in your results.’ ‘Happy,’ in what sense? It is not to be supposed that we pursue a defined object, or that we have a course to sustain. We seek the truth and nothing more. It makes no difference whether we shall discover approximations or distinctions from the animals. The only indication of distinction from the animals is to see correctly, and not to nurse preconceived ideas and illusions. The Anthropological Society does not belong to any sect, neither in one sense nor in another."

— It is undoubtedly the opinion of the more advanced teachers of high and normal schools that some time should be given in the common schools to the study of biology, *i. e.*, of plants and animals. The study of plants is perhaps easier to handle in schools and with large classes of children than that of animals, and should precede the study of the latter. Children of from eight to ten years can easily be taught to understand the parts of a flowering plant, the roots, stem, leaves, corolla, petals, pistil, stamens and anthers; and flowers of different species can

be obtained in sufficient quantities to enable teachers to place one in the hands of each child. What we have to suggest refers chiefly to the study of animals.

The popular conceptions of the study of zoölogy in schools, as we have learned from conversation with elderly gentlemen, life-long teachers of the old regime, is, that it consists in looking at a few stuffed birds and other specimens of the taxidermist's art, and reading about them in books and memorizing those dreadful objects, zoölogical charts. From such a standpoint they do not think much of the study of zoölogy as a discipline. In fact, the presentation of an essay on the study of zoölogy as a mental discipline, before a meeting of teachers, was received with mild incredulity. Nothing but sums and grammatical rules will, in the mind of the average school-teacher, meet the demands of the times.

And so the first difficulty we have to contend with is the ignorance and often the prejudice of the teachers. We have few, very few men or women, who know anything of zoölogy. It is taught in the higher schools from books and charts. Where it is taught as an elective in college, it is studied but a few hours a week for one term or perhaps half a year. A young man graduates and teaches mathematics and Latin and Greek, after having studied it from eight to ten years. In those directions he has had a special training. Were a fair amount of college time given to biological study, we should see these studies introduced into the common schools and have teachers fairly competent to teach them.

Our remedy for the deficiency of trained biological teachers would be something after this fashion. A slight knowledge of physical geography and of botany and zoölogy should be required to enter college; some time should be given to these studies, at least as an elective, each year after entering. In this way competent teachers will be graduated.

In the common schools the study of animals should be graded in somewhat the following way: In the primary schools the children up to ten years should learn the parts of a plant; they should also be taught object lessons involving the handling of shells, beetles, should watch a fish alive in a jar, examine stuffed birds; and they should be taught to compare the more obvious parts of a bird with those of a dog, cat or horse.

In the grammar school, besides simple lessons about plants, children from ten to fifteen years of age should have at least a weekly lesson on animals, beginning with clam, quohog and oyster shells, snail shells, beetles and butterflies; they should see, handle and draw a caterpillar, chrysalis and a butterfly, so as to understand something of the metamorphosis of a butterfly. They should also see a fish, draw it, learn the name of the different fins, see the gills, and the teeth on the inside of the mouth; a frog

and its tadpole should be shown; a bird and its egg, and a cat or dog, and they should compare the limbs and other parts of a quadruped with their own arms, hands, legs and feet. A lesson once a week through each year of grammar-school life could be well taken from the time given to geography, in which the pupil is forced to learn, besides what is valuable and necessary, a mass of useless information, two years being given to the study of a single book. We are convinced that geography, as usually taught, is a sham and a delusion, the books contain a great deal of useless stuff, and at least a quarter of the time devoted to the study might be given to natural history.

Having thus had at least a weekly lesson in zoölogy in the three years of grammar-school life, and having learned the different parts of a clam shell, and the parts of the animal, without dissection, and so on with the beetle, butterfly, fish, frog, bird and mammal, the pupil enters the high school. Here the boy or girl can, with the aid of a competent teacher, take a rather more advanced course with the same species of animal he has already had. The clam can be in part dissected; the lobster or crayfish and beetle, butterfly and higher animal can be partially dissected. In the case of a fish the student can, in connection with the study of physiology, dissect the animal and see for himself the heart, stomach, intestine and brain, and so with a chicken or bird of any sort. We have with much satisfaction taught a class of boys from a high school to dissect a lobster, and they enjoyed the work. By spending but a single hour a week, and confining the class to but few objects, they can obtain a fair idea of zoölogy, which will be a pleasure and involve a fair share of mental discipline, and have taken but little time from other studies.

A candidate for admission to college, and but few high school graduates go to college, should pass an examination involving a knowledge of but a few animal types, such as a clam, a lobster, a beetle, fish and bird; with this knowledge he can then appreciate an advanced course in general zoölogy, involving the laws of morphology, reproduction, embryology and zoö-geography, and by the senior year be able to digest the laws of the geological succession of animals, and of their evolution as well as of palæontology, for without a knowledge of these topics no young man has had a liberal education, and the young man who has not had such a course will be incompetent to teach biology in the common schools.

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RECENT LITERATURE.

NEWCOMB AND HOLDEN'S BRIEFER ASTRONOMY.¹—Modern astronomy is now so closely allied in some of its methods, and

¹ *American Science Series, Briefer Course. Astronomy.* By SIMON NEWCOMB and EDWARD S. HOLDEN. New York, Holt & Co. 12mo, pp. 338.